anticipated by Logan et al; Claims 2-6, 9, 11, 17, 19 and 20 were rejected under 35 U.S.C. § 103(a) as unpatentable over Logan et al in view of JP 407337630A (Edamura); Claim 7 was rejected under 35 U.S.C. § 103(a) as unpatentable over Logan et al in view of Edamura and Arasawa et al; Claims 8 and 13 were rejected under 35 U.S.C. § 103(a) as unpatentable over Logan et al in view of Edamura and Fuji et al; Claims 21 and 22 were rejected under 35 U.S.C. § 103(a) as unpatentable over Logan et al in view of Edamura and Ameen et al; Claims 14 and 15 were indicated as allowable if rewritten in independent form; and Claim 16 was indicated as allowable if rewritten to overcome the rejections under 35 U.S.C. § 112, second paragraph.

Applicant thanks the Examiner for the indication of allowable subject matter.

Regarding the rejection of Claims 3 and 16 under 35 U.S.C. § 112, second paragraph, these claims have been cancelled and accordingly these rejections are moot.

Claims 1, 10, 12 and 18 stand rejected under 35 U.S.C. § 102(b) as anticipated by Logan et al. This rejection is respectfully traversed.

Amended Claim 1 is directed to a heater system including a heater base integrally formed of a ceramic material. The heater base includes a mounting surface, a heater and a fluid passage provided in the heater base which is located below the heater. Further, the heater base is cooled by causing a fluid whose temperature is lower than a temperature of the heater base to be supplied to the fluid passage. Independent Claim 18 includes similar features.

In a non-limiting example, Figures 1 and 2 illustrate a ceramic heater system 1 including a heater base 2 formed of a ceramic material. The heater base 2 includes a mounting surface 2a and a heater 3 buried in the heater base 2 for heating an object such as a wafer W. Also included is a fluid passage 4 provided in the heater base and being located

below the heater 3. Further, the heater base 2 is cooled by causing a fluid whose temperature is lower than a temperature of the heater base 2 to be supplied to the fluid passage 4.

Thus, the present invention provides a ceramic heater system which has a high cooling efficiency while keeping the uniform heating performance on the heating surface high (see page 4, lines 15-18).

The outstanding Office Action states Logan et al teach the claimed invention and cites Figure 1. However, Applicant notes the heater system disclosed in Logan et al does not include a heater base integrally formed of a ceramic material which includes a mounting surface, a heater and a fluid passage as a single body. Rather, as shown in Figure 1 of Logan et al, the heater system includes a top insulating layer 42, an electrostatic pattern layer 44, a heating layer 50 and a support 60. In this figure, the only components which are bonded to each other are the ceramic support 60 and the heat sink base 70 formed of iron/nickel/cobalt /alloy. This differs from the claimed invention in which the heater is embedded in the ceramic heater base, and a fluid passage is also formed in the ceramic heater base.

Accordingly, it is respectfully submitted independent Claims 1 and 18 and each of the claims depending therefrom patentably define over Logan et al.

Claims 2-6, 9, 11, 17, 19 and 20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Logan et al in view of Edamura. This rejection is respectfully traversed.

Similar arguments apply to independent Claim 19 as that discussed above with respect to Claim 1. In particular, independent Claim 19 recites that the ceramic heater system includes an upper heater base integrally formed of a ceramic material, and a lower heater base formed of a ceramic material. The upper heater base and the lower heater base form a one-body heater base, with a lower surface of the upper heater base being in tight contact with the lower heater base. The heater base includes a mounting surface, a heater buried in

the upper heater base and a fluid passage provided in the lower surface of the heater base and is formed as a groove through which a fluid is supplied toward the mounting surface. As discussed above, Logan et al do not teach or suggest these features. Further, it is respectfully submitted that Edamura also do not teach or suggest these features.

In addition, Claims 2-6, 9, 11 and 17 depend either directly or indirectly on Claim 1, and Claim 20 depends on Claim 19. The outstanding Office Action indicates that the groove 7 described in the Abstract of Edamura is arranged on a chuck base. However, the groove 7 is formed in a surface of the stage and is not located inside the stage. In fact, as described at lines 5-6 of the Abstract, the "groove 7 is cut in the shape of a circle along the periphery of the stage 3." That is, the groove 7 is an annular groove which is formed in the surface of the stage. The groove is not formed in the internal region of the stage. Further, as described in lines 7-8, a mixture gas containing Ar and He is introduced into the region between the stage 3 and the wafer. The mixture gas serves to directly cool the wafer heated with the plasma, so that the temperature of the wafer can be uniformly controlled.

In the present invention, a fluid passage is formed inside the ceramic heater base, such that the ceramic heater base is cooled when the apparatus is stopped or a cleaning process is executed (the temperature is lowered to be less than 300°C from a temperature which is in the range of 500-700°C).

Further, it is respectfully submitted the additional rejections of the dependent claims have also been overcome as the additional publications of Arasawa et al, Fuji et al, and Ameen et al also do not teach or suggest the features recited in the independent claims.

In addition, new Claims 23-50 have been added to set forth the invention in varying scope, and Applicant submits the new claims are supported by the originally filed

specification. It is respectfully submitted new Claims 23-50 are allowable for similar reasons as that discussed above.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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IN THE CLAIMS

1. (Amended) A ceramic heater [system-comprising] system comprising:

[a ceramic heater base having a substrate mounting surface formed on a top surface thereof;]

a heater base integrally formed of a ceramic material,

the heater base including:

a mounting surface which is formed as an upper surface of the heater base and on which an object is mounted,

a heater, buried in said heater base, for heating [a substrate;] the object, and

a fluid passage provided in said heater base below said heater,

[whereby] wherein said heater base is cooled by [letting] causing a fluid whose temperature is lower than a temperature of said heater base [flow in] to be supplied through said fluid passage.

2. (Amended) The ceramic heater system according to claim 1, wherein said fluid passage has a plurality of concentric circular passage portions and a plurality of penetration passage portions connecting the circular portions passage[, and any adjacent two of the penetration passage portions are not aligned in a radial direction].

Claim 3 (Canceled).

4. (Amended) The ceramic heater system according to claim 2, wherein said fluid passage has a fluid inlet formed in a central portion of [in] a lower [portion] surface of said

heater base, and fluid outlets [at end portions] formed in outer circumference portions of the lower surface of said heater base.

6. (Amended) The ceramic heater system according to claim 5, wherein said [fluid is a] mixed gas [of] contains Ar and He.

7. (Amended) The ceramic heater system according to claim 1, wherein a ratio of [H_2] He flow rate to Ar flow rate is 20% or more.

11. (Amended) The ceramic heater system according to claim [9] 10, wherein said heater has glassy boron nitride coated on an outer surface of graphite or glassy carbon of which said heater is formed.

12. (Amended) The ceramic heater system according to claim 1, further comprising:

an electrode buried in said heater base [above said heater] and located between the heater and the mounting surface; and

[a DC] power supply means for applying a DC voltage to said electrode,

[whereby applying said DC voltage to said electrode causes said substrate mounted on said mounting surface to be electrostatically chucked]

wherein, when the voltage is applied to the electrode, an electrostatic chuck is formed, the electrostatic chuck being for electrostatically attracting or repulsing the object mounted on the heater base, and the electrostatic chuck and the heater forming a one-body structure.

Claims 14-16 (Canceled).

17. (Amended) The ceramic heater system according to claim [2] 1, wherein said fluid passage has a fluid inlet formed in a central portion of a lower [portion] surface of said heater base, and [a plurality of] fluid outlets formed through circumferential side walls of said heater base.

18. (Amended) A ceramic heater system comprising:

[an upper heater base of ceramics having a substrate mounting surface formed on a top surface thereof and a groove formed at a bottom surface to serve as a fluid passage;

a lower heater base of ceramics closely adhered to a bottom side of said upper heater base, thereby making said groove airtight; and]

an upper heater base integrally formed of a ceramic material; and

a lower heater base formed of a ceramic material, the upper heater base and the lower heater base forming a one-body heater base, with a lower surface of the upper heater base being in tight contact with the lower heater base,

the heater base including:

a mounting surface which is formed as an upper surface of the heater base and on which an object is mounted,

a heater, buried in said upper heater base, for heating [a substrate] the object,

a fluid passage provided in the lower surface of the heater base and formed as a groove through which a fluid is supplied toward the mounting surface,

[whereby] wherein said heater base is cooled by causing a fluid [having a] whose temperature is lower than [temperatures of said upper and lower heater bases to flow in said fluid passage] a temperature of the heater base to be supplied through the fluid passage.

19. (Amended) A substrate processing apparatus comprising:

a chamber whose interior can be kept in a vacuum state by an exhaust system;

a ceramic heater system[, placed in said chamber, for heating a substrate mounted thereon] which is provided in the chamber and which heats an object; and

processing means for performing a predetermined treatment on said substrate in said chamber,

said ceramic heater system including,

[a ceramic heater base hawing a substrate-mounting surface formed on a top surface thereof,]

a heater base integrally formed of a ceramic material, LAB

a mounting surface formed on a top surface of a heater base,

a heater, buried in said heater base, for heating said [substrate] object, and

a fluid passage provided in said heater base and located below said heater, [whereby] wherein said heater base is cooled by letting a fluid whose temperature is lower than a temperature of said heater base flow in said fluid passage.

21. (Amended) The substrate processing apparatus according to claim 20, further comprising:

a high-frequency power supply, connected to said shower head, for electrically, isolating said shower head and applying high-frequency power to said shower head[,]; and

[whereby applying said high-frequency power produces plasma in said chamber with said process gas supplied inside from said shower head and said film is formed on said substrate by a reaction of said process gas with said plasma]

a lower electrode embedded in the heater base and located between an upper surface of the heater base and the heater,

wherein plasma is generated by applying the high-frequency power to the shower head in the chamber which is in a gaseous atmosphere supplied with the process gas from the shower head, and a film is formed on the object by a reaction of the process gas with the plasma.

22. (Amended) The substrate processing apparatus according to claim 19, wherein said processing means includes:

[an etching-gas] a gas feeding mechanism for feeding an etching gas[; and],

an electrically isolated shower head, provided in said chamber at a ceiling thereof, for introducing said [etching] process gas from said [etching gas supply] gas feeding mechanism[;],

a high-frequency power supply, connected to said shower head, for applying high-frequency power to said shower head, and

[whereby applying said high-frequency power produces plasma in said chamber with said etching gas supplied inside from said shower head and said film is formed on said substrate by a reaction of said etching gas with said plasma]

a lower electrode embedded in the heater base and located between the heater base and the heater,

wherein, when the high-frequency power is applied to the shower head and/or the lower electrode in a chamber atmosphere into which the etching gas is supplied from the shower head, plasma is generated and a surface of the object is etched by a reaction of the etching gas.

Claims 23-50 (New).--